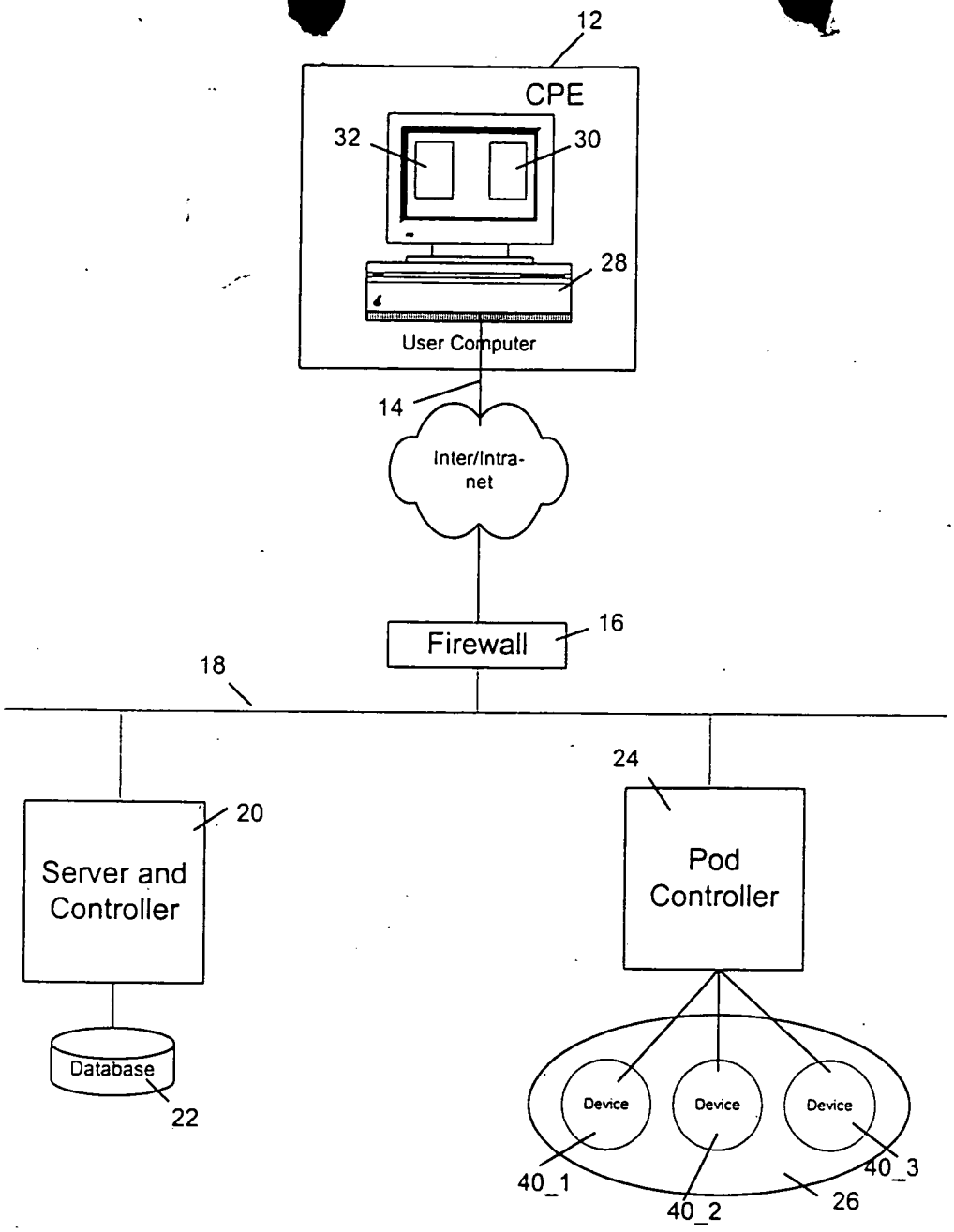

12
CPE
32
30
28
User Computer
14
Inter/Intra-
net
Firewall
16
18
20
Server and
Controller
Database
22
24
Pod
Controller
Device
Device
Device
40_1
40_2
40_3
26

Figure 1

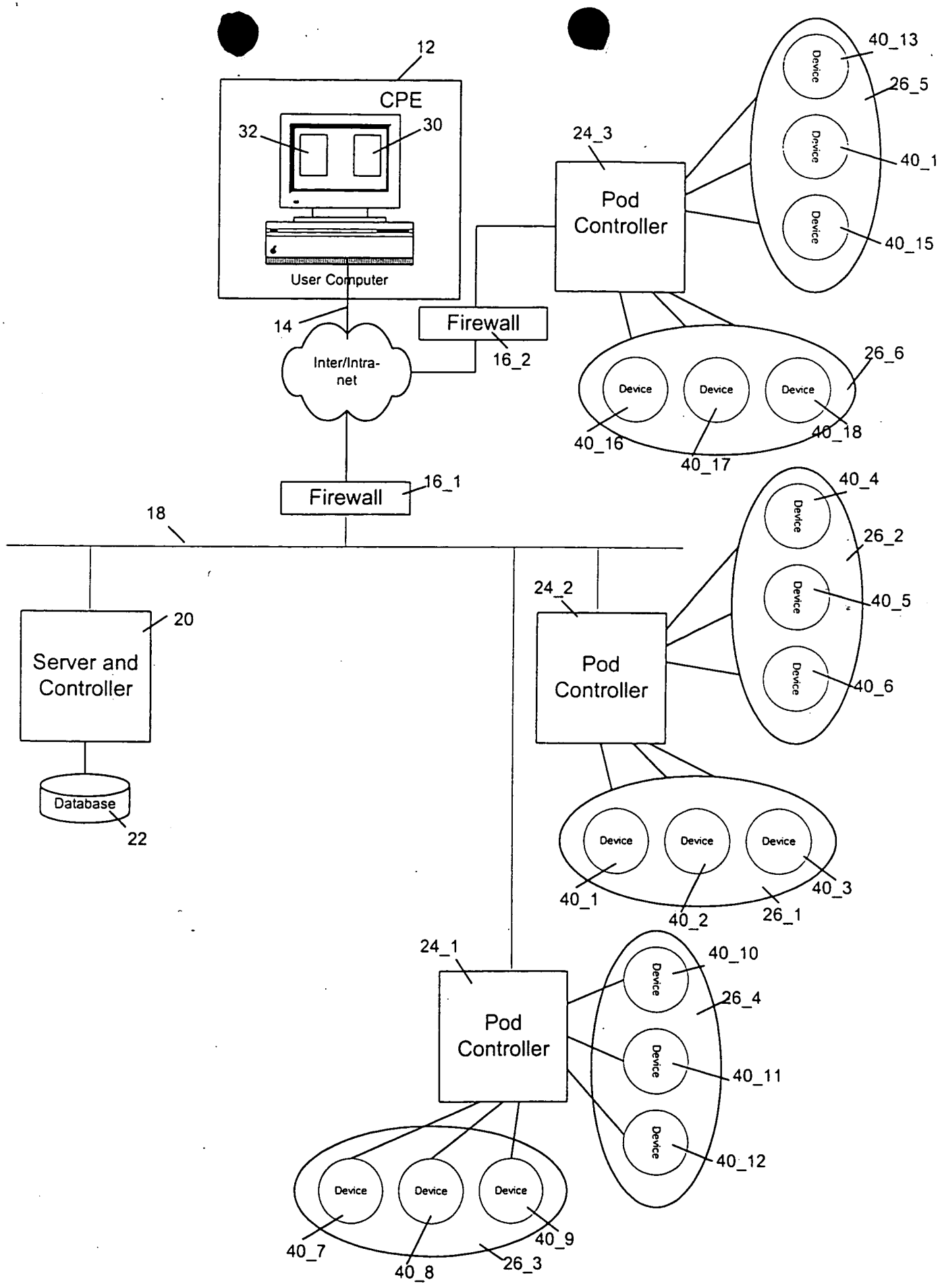

12
CPE
32
30
User Computer
14
Inter/Intra-net
Firewall
16_2
24_3
Pod Controller
40_13
26_5
40_1
40_15
26_6
40_16
40_17
40_18
Firewall
16_1
18
Server and Controller
20
Database
22
24_2
Pod Controller
40_4
26_2
40_5
40_6
40_1
40_2
40_3
26_1
24_1
Pod Controller
40_10
26_4
40_11
40_12
40_7
40_8
40_9
26_3
Device

Figure 2

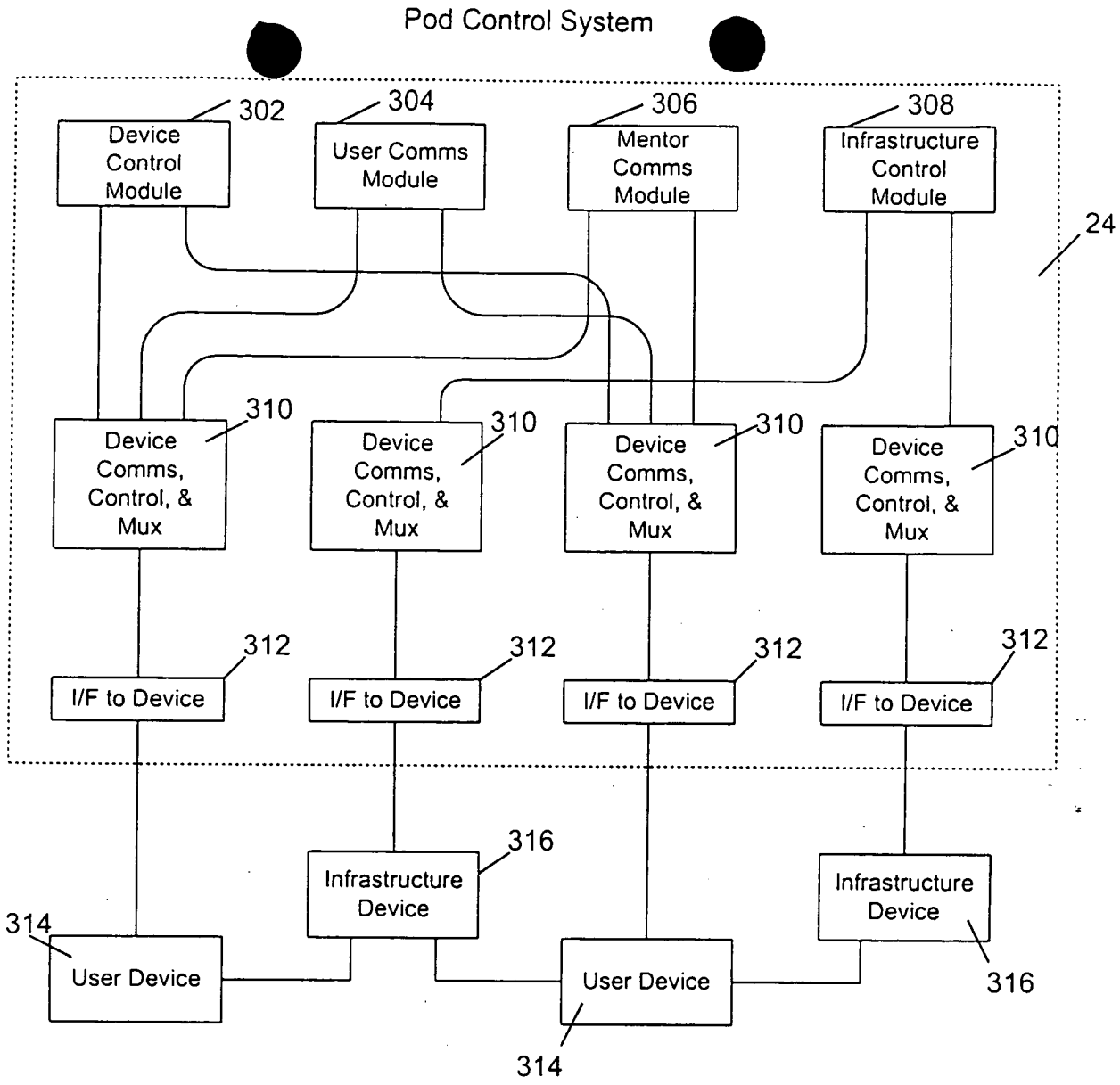
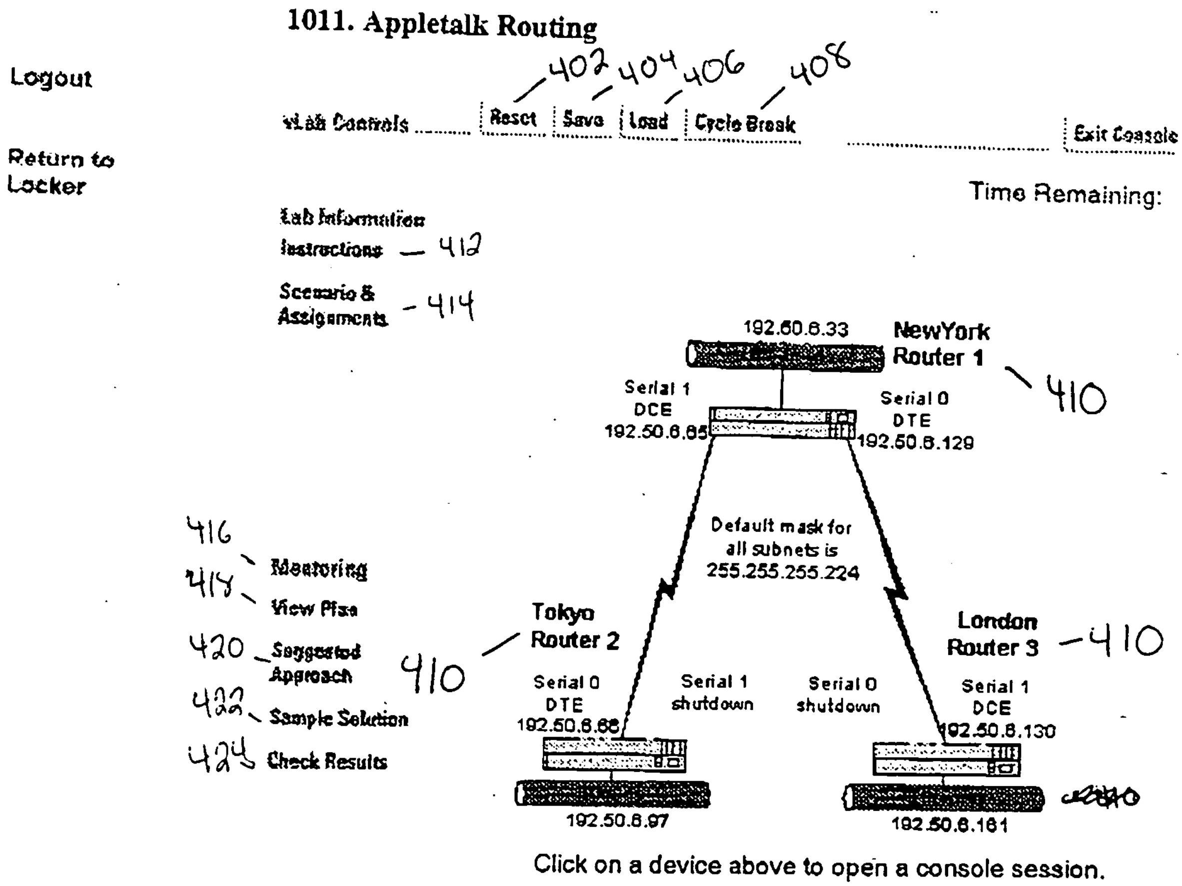

Pod Control System
Device Control Module
302
User Comms Module
304
Mentor Comms Module
306
Infrastructure Control Module
308
24
Device Comms, Control, & Mux
310
I/F to Device
312
Infrastructure Device
316
User Device
314

Figure 3



1011. Appletalk Routing
Logout
Return to Locker
vLab Controls
Reset
Save
Load
Cycle Break
Exit Console
402
404
406
408
Time Remaining:
Lab Information
Instructions
412
Scenario & Assignments
414
Mentoring
416
418
Suggested Approach
420
Sample Solution
422
Check Results
424
192.50.6.33
NewYork Router 1
410
Serial 1 DCE 192.50.6.65
Serial 0 DTE 192.50.6.129
Default mask for all subnets is 255.255.255.224
Tokyo Router 2
410
London Router 3
410
Serial 0 DTE 192.50.6.66
Serial 1 shutdown
Serial 0 shutdown
Serial 1 DCE 192.50.6.130
192.50.6.97
192.50.6.161
Click on a device above to open a console session.

Figure 4

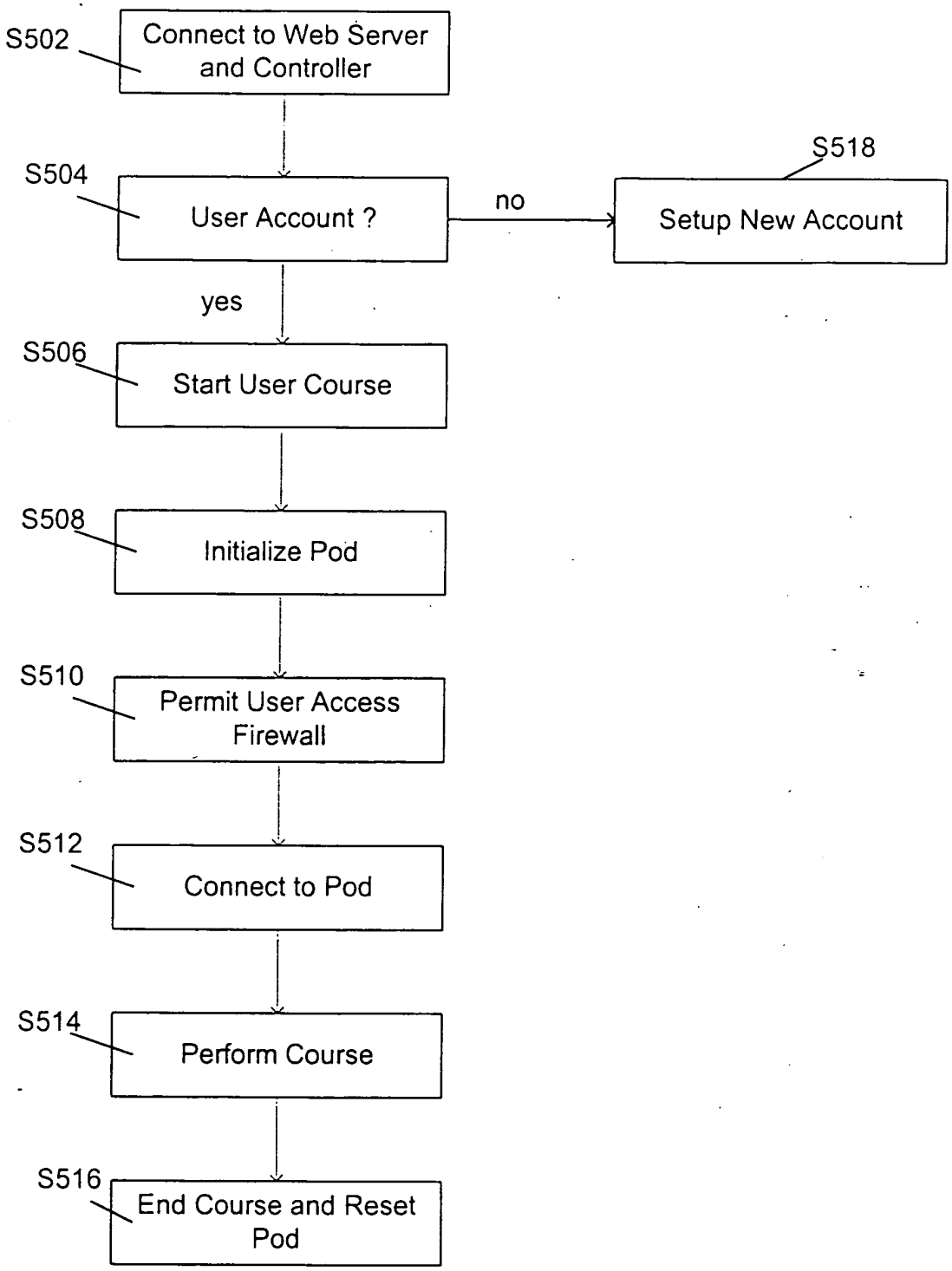

S502
Connect to Web Server and Controller
S504
User Account ?
no
S518
Setup New Account
yes
S506
Start User Course
S508
Initialize Pod
S510
Permit User Access Firewall
S512
Connect to Pod
S514
Perform Course
S516
End Course and Reset Pod

Figure 5

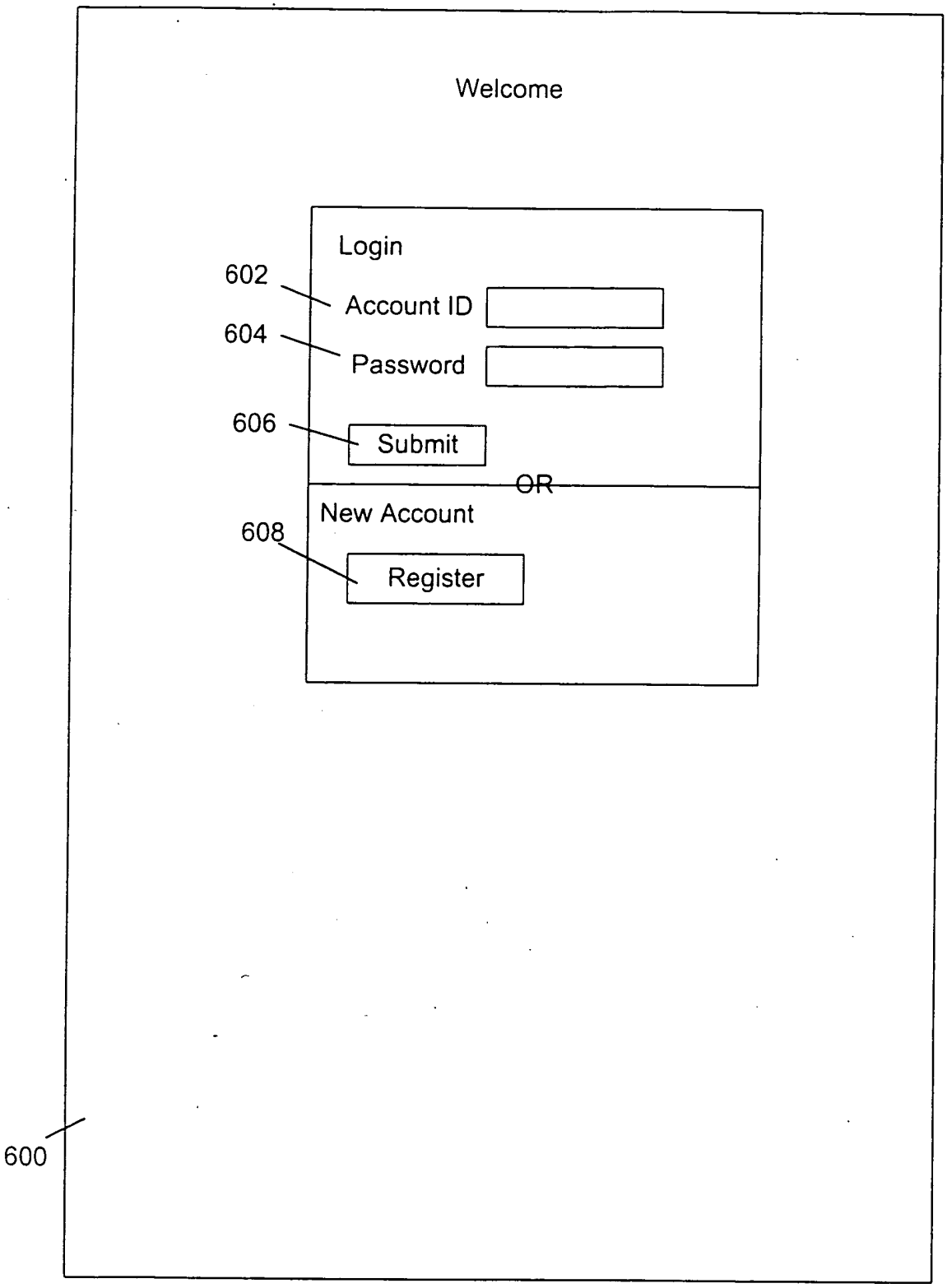

Welcome
Login
602
Account ID
604
Password
606
Submit
OR
New Account
608
Register
600

Figure 6

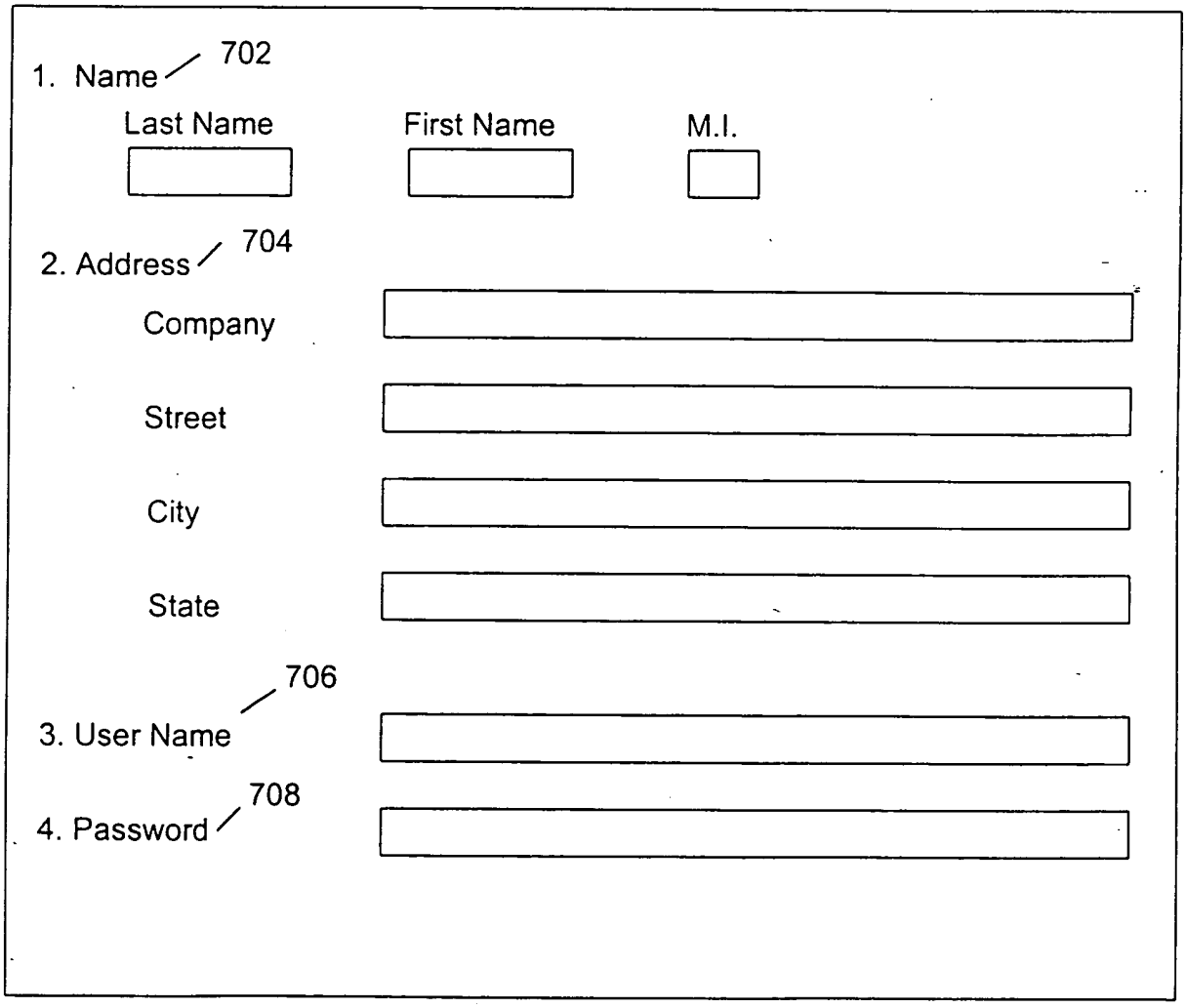

1. Name
702
Last Name
First Name
M.I.
2. Address
704
Company
Street
City
State
3. User Name
706
4. Password
708

Figure 7

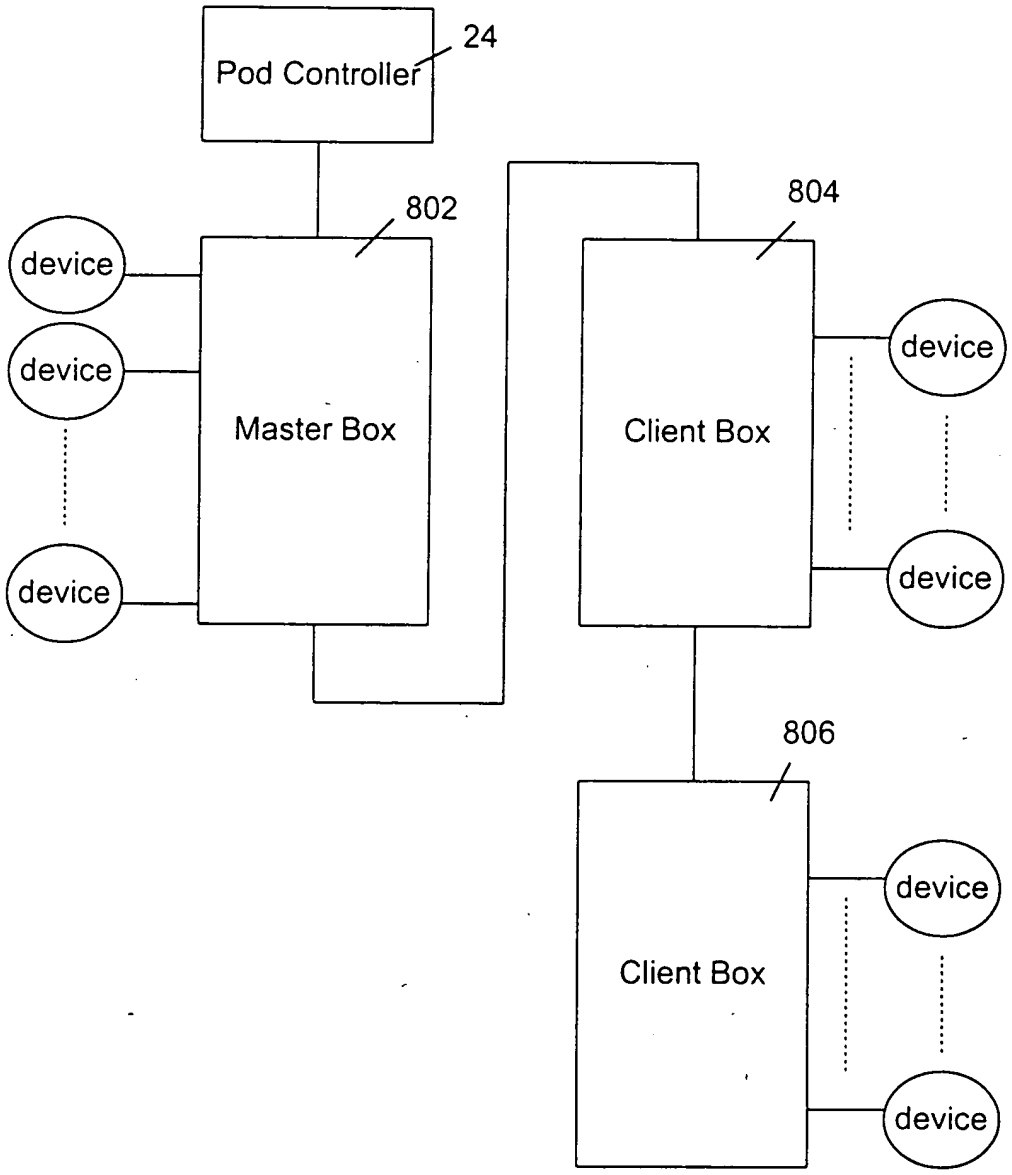

Pod Controller
24
802
804
device
device
device
Master Box
Client Box
device
device
806
Client Box
device
device

Figure 8

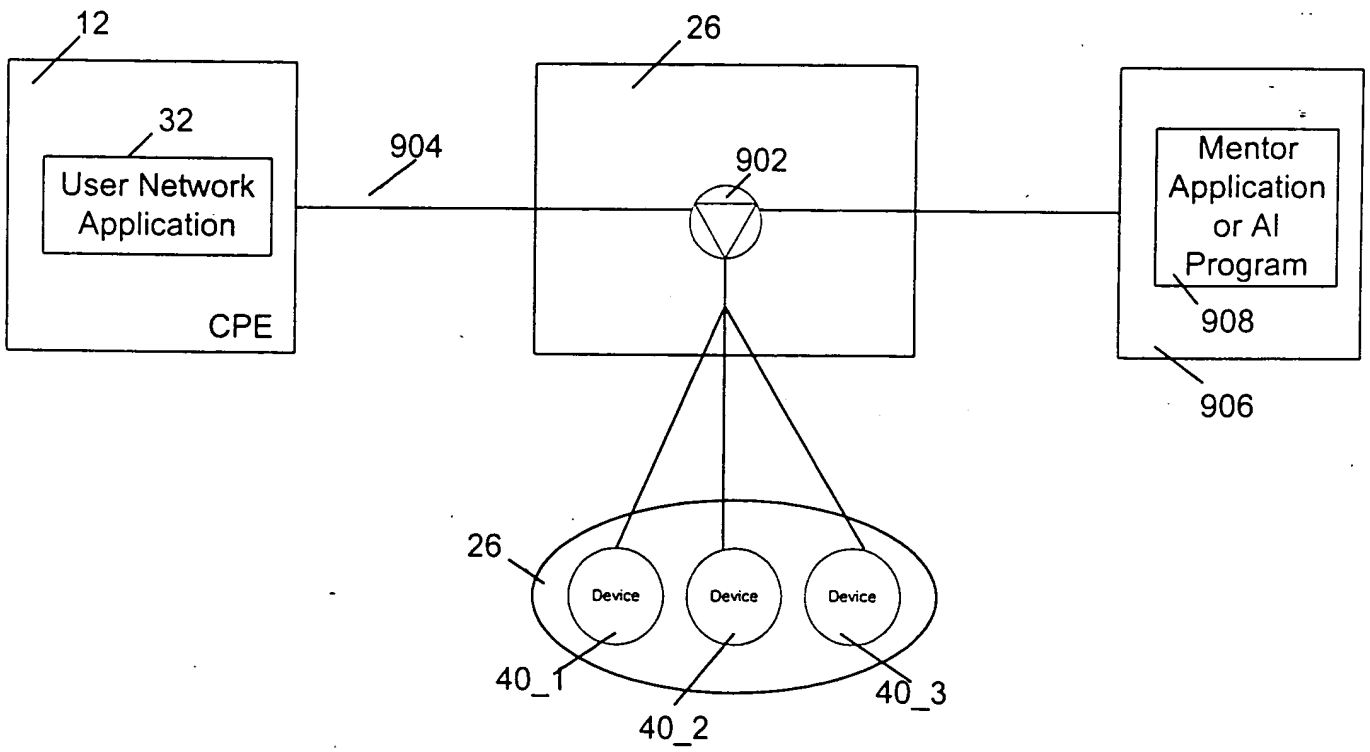

12
32
User Network Application
CPE
904
26
902
Mentor Application or AI Program
908
906
26
Device
Device
Device
40_1
40_2
40_3

Figure 9

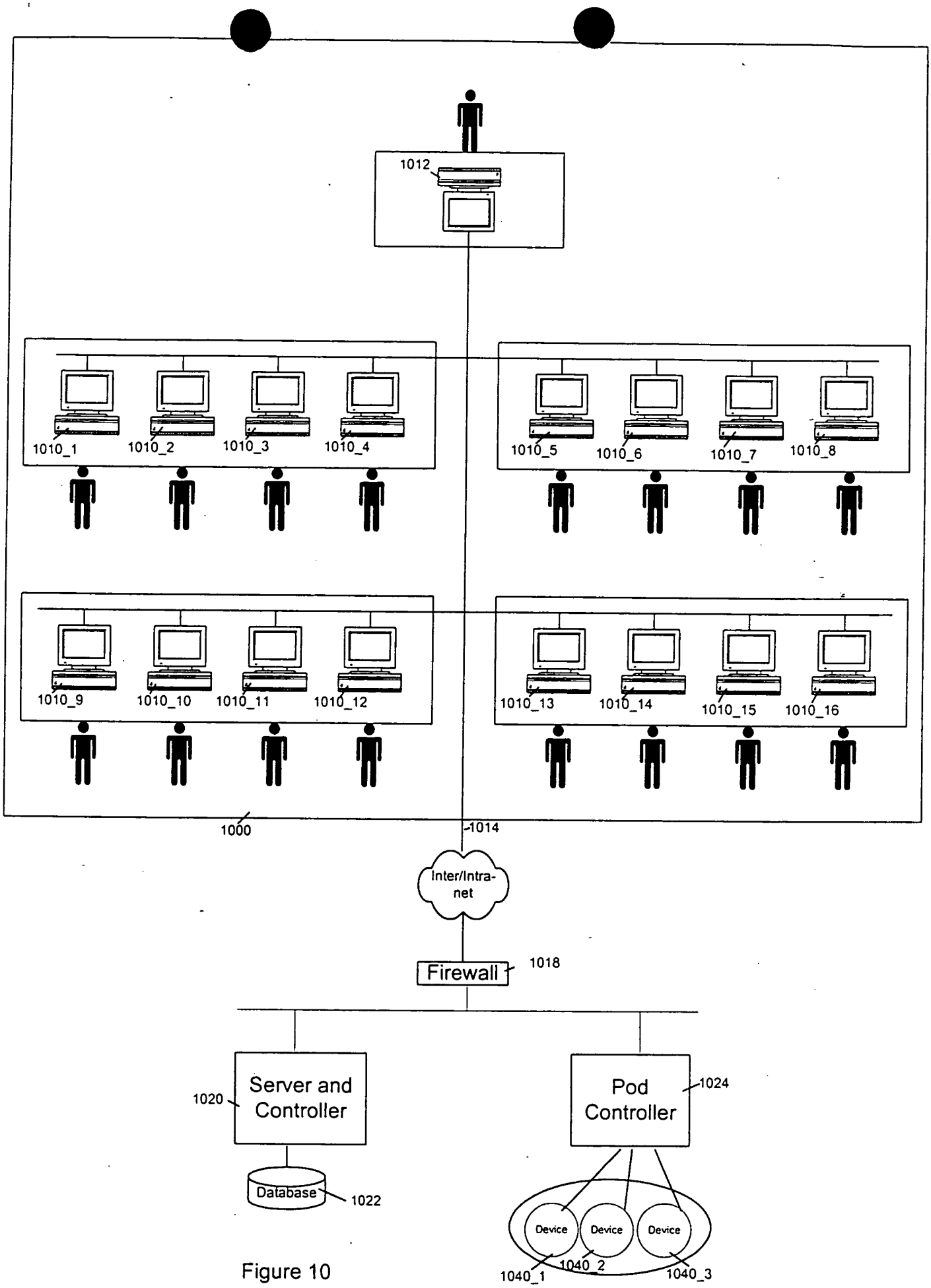

1012
1010_1
1010_2
1010_3
1010_4
1010_5
1010_6
1010_7
1010_8
1010_9
1010_10
1010_11
1010_12
1010_13
1010_14
1010_15
1010_16
1000
1014
Inter/Intra-net
Firewall
1018
Server and Controller
1020
Database
1022
Pod Controller
1024
Device
Device
Device
1040_1
1040_2
1040_3

Figure 10

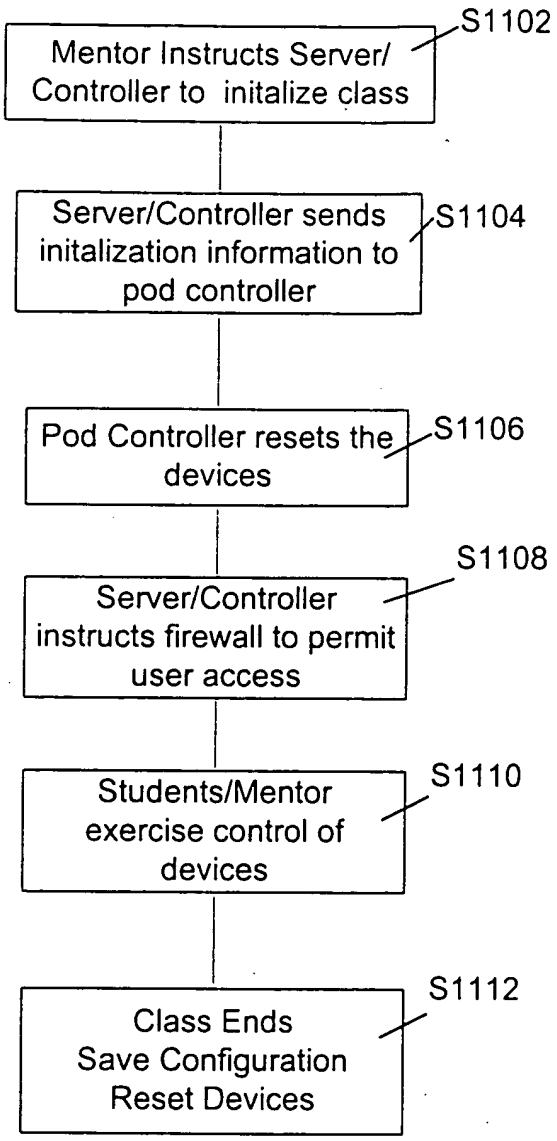

S1102
Mentor Instructs Server/ Controller to initalize class
S1104
Server/Controller sends initalization information to pod controller
S1106
Pod Controller resets the devices
S1108
Server/Controller instructs firewall to permit user access
S1110
Students/Mentor exercise control of devices
S1112
Class Ends
Save Configuration
Reset Devices

Figure 11

Learning Structure

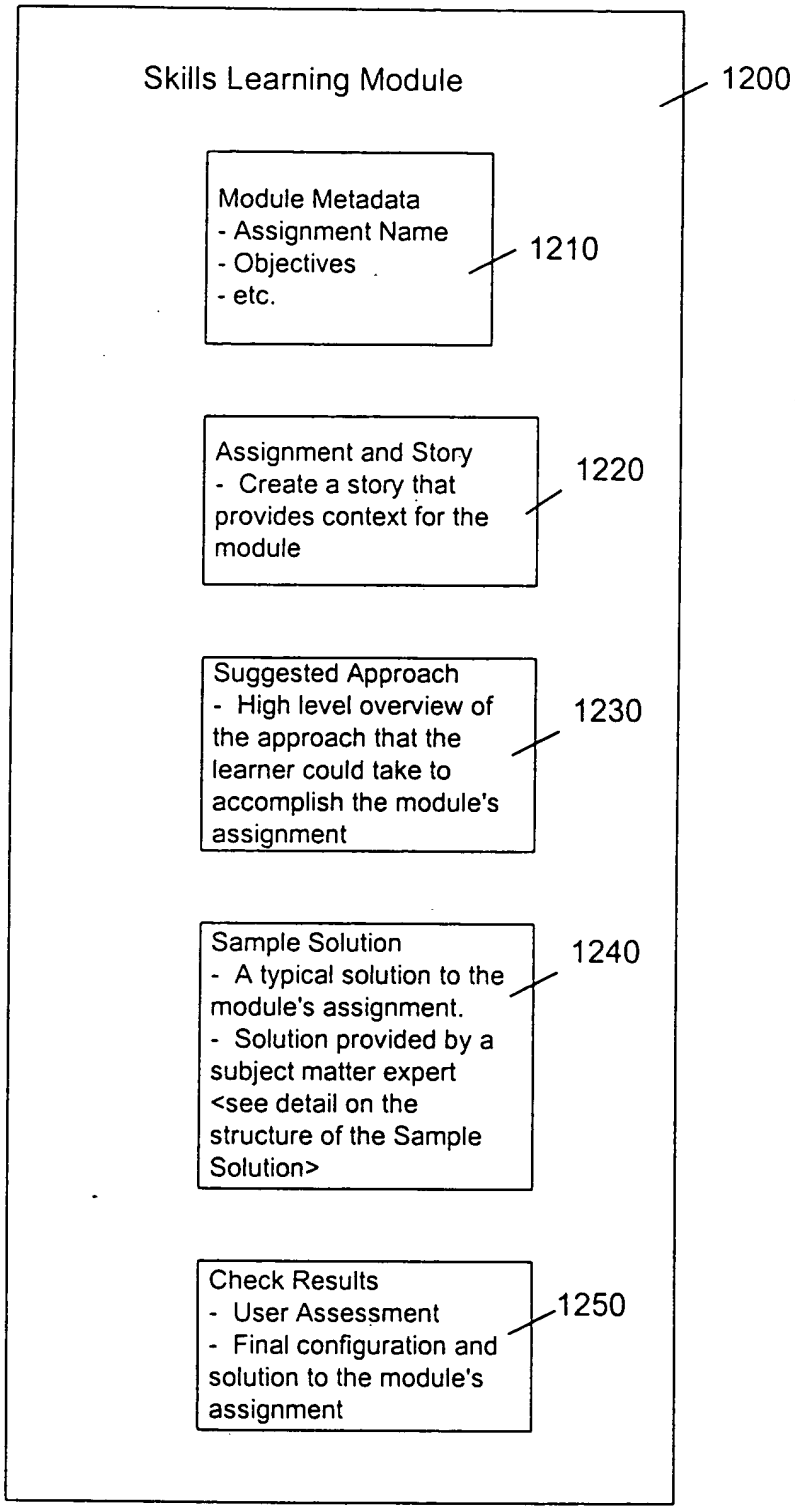


Figure 12

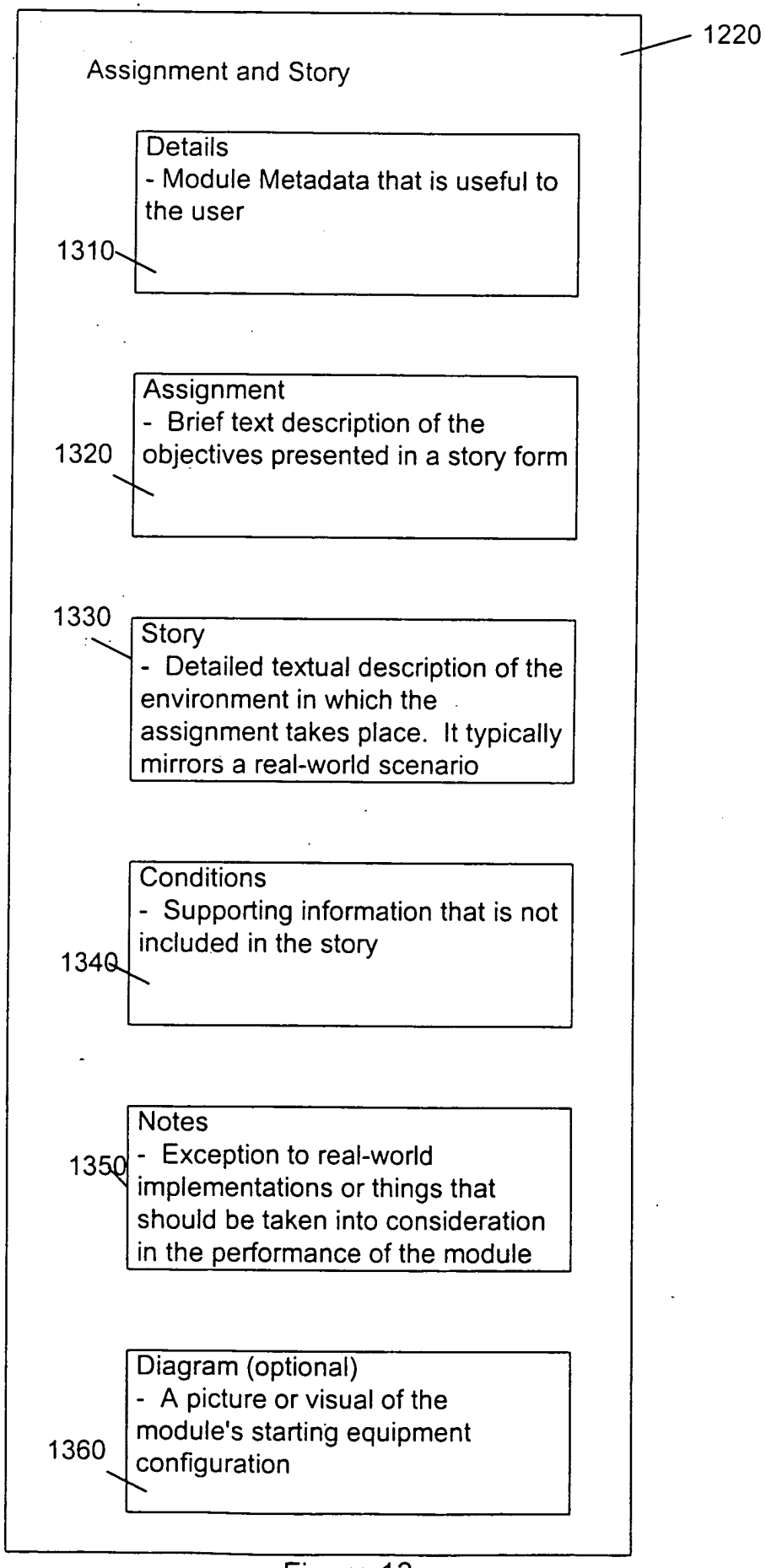

1220
Assignment and Story
Details
- Module Metadata that is useful to the user
1310
Assignment
- Brief text description of the objectives presented in a story form
1320
1330
Story
- Detailed textual description of the environment in which the assignment takes place. It typically mirrors a real-world scenario
Conditions
- Supporting information that is not included in the story
1340
Notes
- Exception to real-world implementations or things that should be taken into consideration in the performance of the module
1350
Diagram (optional)
- A picture or visual of the module's starting equipment configuration
1360

Figure 13

scenario | Lab Highlights | Story | Conditions | Diagram

1011. Appletalk Routing

Details — 1410

vLab Title	1011. Appletalk Routing
Technology	Network Layer
Level of Difficulty	Basic
Time Required	57 mins
Certification	CCNA
Desired Learner Outcomes	Experience designing and implementing Appletalk in a network.
Desired Network Outcomes	Appletalk routing is operational on the network.

Top

Assignment — 1420

Design an Appletalk numbering plan and enable Appletalk routing

Top

Story

Your network manager has told you that your network will soon have to carry Appletalk traffic. In order for this to happen you must plan an Appletalk numbering scheme and assign Appletalk zone names for each of the segments in your network. You will also enable Appletalk routing on all of the active interfaces on your routers. Once Appletalk is enabled on the routers and configured on the interfaces, you should verify that Appletalk is functioning properly.

Top

Conditions — 1430

IP routing is already up and running on this network. **DO NOT CHANGE ANY OF THE IP ROUTING CONFIGURATIONS.**

Your Apple administrator has given you the following range of Appletalk network numbers, 2000 – 2999. You may use any number within that range to assign a unique Appletalk network number to each segment in the network. All of the serial links should be configured in the 'cereal zone'. You should make up unique zone names for each of the Ethernet interfaces.

Top

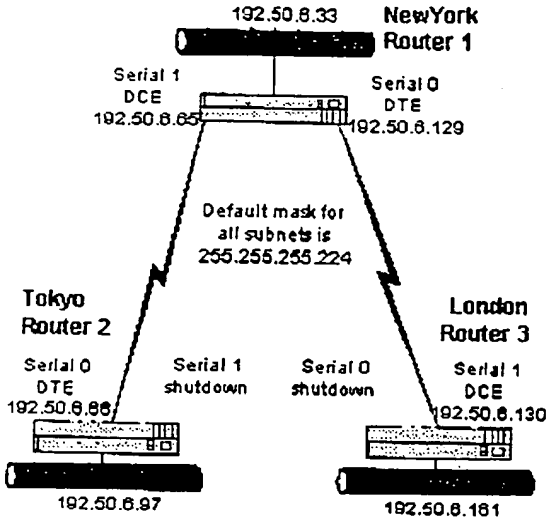
Notes — 1440

The serial links between routers are implemented via direct connections in this lab and do not actually connect through any leased line services for the serial links. Here is the existing IP network. Use this as a starting point to plan your Appletalk Network.

Top

Figure 14-9

Diagram – 1460



Top

Figure 14-b

Suggested Approach

1011. Appletalk Routing

Figure out the Appletalk numbering plan. Assign a unique Appletalk cable range to each network segment. Note the Appletalk zone names on each network. Enable Appletalk routing on the routers, then configure the appropriate Appletalk cable range on each active router interface. Once that is done verify proper Appletalk operation using show commands.

Figure 15

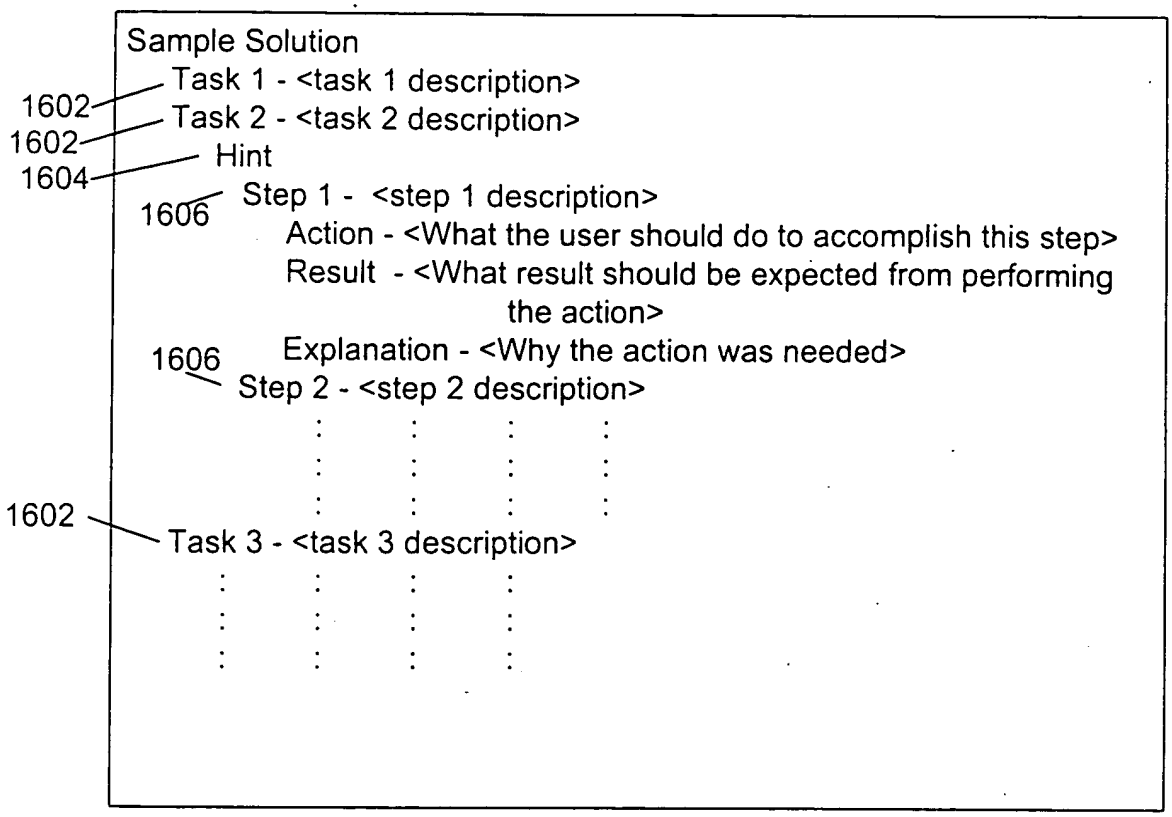

Sample Solution
1602
Task 1 - <task 1 description>
1602
Task 2 - <task 2 description>
1604
Hint
1606
Step 1 - <step 1 description>
Action - <What the user should do to accomplish this step>
Result - <What result should be expected from performing the action>
1606
Explanation - <Why the action was needed>
Step 2 - <step 2 description>
1602
Task 3 - <task 3 description>

Figure 16

sample solution

1602 — **Plan Appletalk addressing**

1604 — HINT

1606 — **Assign on paper a unique Appletalk network number to each network segment**

Action: Choose a cable range from the addresses that were given to you by the Appletalk administrator (2000 – 2999) for each network segment.

Result: Each 'wire' in the network should get a different Appletalk cable range.

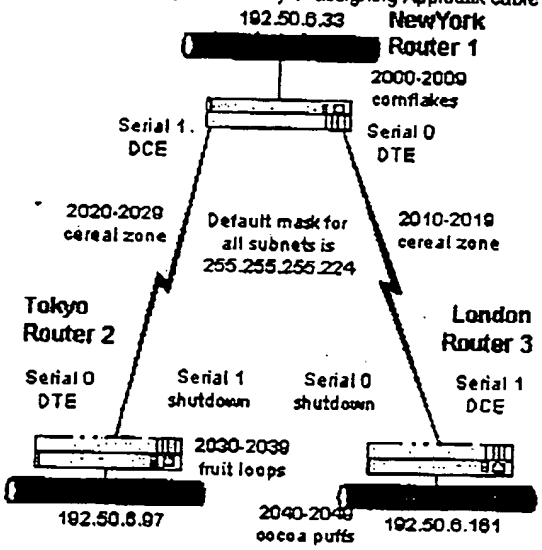
Explanation: Appletalk routing requires that every segment (or wire) in the network have a unique cable range in order for the Appletalk protocol to identify each part (link) of the network. A cable range is a contiguous range of network numbers that is assigned to a network segment. An example of a cable range would be 2300 – 2310. This assigns the range of network numbers from 2300 to 2310 to the network segment. Once you have a completed diagram, note the interfaces that each link connects to.

1606 — **Assign on paper Appletalk zone names to each network segment, and assign all of the serial links in the 'cereal zone'.**

Action: You need to think up three additional unique zone names for each of the Ethernet segments.

Result: An Appletalk zone can cover more than one network segment. Each network segment must be in at least one Appletalk zone. Zones are alpha numeric names, spaces are legal characters. Router ports that connect to the same network segment must be configured identically.

Explanation: The sample diagram shows one possible way of assigning Appletalk cable ranges and zone names to the various links in the network.



1602 — **Enable Appletalk Routing on each router**

1604 — HINT

1606 — **Start the Appletalk routing processes on the New York router.**

Action: appletalk routing

Result:

```
NewYork>en
NewYork#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
NewYork(config)#appletalk routing
NewYork(config)#^Z
NewYork#
%SYS-5-CONFIG_I: Configured from console by console
```

Explanation: The Appletalk routing process is not on by default. You must tell the router that you want it to route Appletalk packets. The "Appletalk routing" command also starts the Appletalk RTMP routing protocol running.

1606 — **Start the Appletalk routing processes on the Tokyo router.**

Figure 17-a

Action: appletalk routing

Result:

```
Tokyo>en
Tokyo#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Tokyo(config)#appletalk routing
Tokyo(config)#^Z
Tokyo#
%SYS-5-CONFIG_I: Configured from console by console
```

Explanation: The Appletalk routing process is not on by default. You must tell the router that you want it to route Appletalk packets. The "Appletalk routing" command also starts the Appletalk RTMP routing protocol running.

1606 — **Start the Appletalk routing processes on the London router.**

Action: appletalk routing

Result:

```
London>en
London#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
London(config)#appletalk routing
London(config)#^Z
London#
%SYS-5-CONFIG_I: Configured from console by console
```

Explanation: The Appletalk routing process is not on by default. You must tell the router that you want it to route Appletalk packets. The "Appletalk routing" command also starts the Appletalk RTMP routing protocol running.

1606 — **Configure the proper Appletalk network number on each interface (Ethernet 0, Serial 0, and/or Serial 1) for the New York router using the diagram you made earlier.**

Action:

```
appletalk cable-range <cable range>
appletalk zone <zone name>
```

Result:

```
NewYork#
%SYS-5-CONFIG_I: Configured from console by console
configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
NewYork(config)#interface serial 0
NewYork(config-if)#appletalk cable-range 2010-2019
NewYork(config-if)#appletalk zone cereal zone
NewYork(config-if)#interface serial 1
NewYork(config-if)#appletalk cable-range 2020-2029
NewYork(config-if)#appletalk zone cereal zone
NewYork(config-if)#interface ethernet 0
NewYork(config-if)#appletalk cable-range 2000-2009
NewYork(config-if)#appletalk zone cornflakes
NewYork(config-if)#^Z
NewYork#
%SYS-5-CONFIG_I: Configured from console by console
```

Explanation: A unique Appletalk cable range must be assigned to each interface routing packets for the Appletalk protocol.

1606 — **Configure the proper Appletalk network number on each interface (Ethernet 0, Serial 0, and/or Serial 1) for the Tokyo router using the diagram you made earlier.**

Figure 17-6

Action:

```
appletalk cable-range <cable range>
appletalk zone <zone name>
```

Result:

```
Tokyo#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Tokyo(config)#int e 0
Tokyo(config-if)#appletalk cable-range 2030-2039
Tokyo(config-if)#appletalk zone fruit loops
Tokyo(config-if)#int s 0
Tokyo(config-if)#appletalk cable-range 2020-2029
Tokyo(config-if)#appletalk zone cereal zone
Tokyo(config-if)#^Z
Tokyo#
%SYS-5-CONFIG_I: Configured from console by console
```

Explanation: A unique Appletalk cable range must be assigned to each interface routing packets for the Appletalk protocol.

1606 — **Configure the proper Appletalk network number on each interface (Ethernet 0, Serial 0, and/or Serial 1) for the London router using the diagram you made earlier.**

Action:

```
appletalk cable-range <cable range>
appletalk zone <zone name>
```

Result:

```
London#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
London(config)#int e 0
London(config-if)#appletalk cable-range 2040-2049
London(config-if)#appletalk zone cocoa puffs
London(config-if)#int s 1
London(config-if)#appletalk cable-range 2010-2019
London(config-if)#appletalk zone cereal zone
London(config-if)#^Z
London#
%SYS-5-CONFIG_I: Configured from console by console
```

Explanation: A unique Appletalk cable range must be assigned to each interface routing packets for the Appletalk protocol.

1602 — **Verify Proper Operation of Appletalk Routing**

1604 — HINT

1606 — **Use a brief version of a show command to see that the Appletalk protocol is properly configured and running on the New York router.**

Action: show appletalk interface brief

Result:

```
NewYork#show appletalk interface brief
Interface        Address      Config        Status/Line Protocol  Atalk Protocol
BRI0             unassigned   not config'd  administratively down n/a
BRI0:1           unassigned   not config'd  administratively down n/a
BRI0:2           unassigned   not config'd  administratively down n/a
Ethernet0        2002.14      Extended      up                    up
Serial0          2010.174     Extended      up                    up
Serial1          2025.55      Extended      up                    up
Serial2          unassigned   not config'd  administratively down n/a
Serial3          unassigned   not config'd  administratively down n/a
```

Explanation: The three interfaces you configured (E0, S0 and S1) on router 1 (NewYork) all show that they are 'up'. This means that they are properly configured and operational. This is a good quick check to see if the Appletalk protocol is running. If one of the interfaces that you have configured is 'down', check to be sure that the interface at the other end of the link has the same Appletalk cable range configured on it. The number after the cable-range number is the host number. The host number is dynamically assigned and will probably be different in your display.

1606 — **Use a brief version of a show command to see that the Appletalk protocol is properly configured and running on the Tokyo router.**

Figure 17-c

Action: show appletalk interface brief

Result:

```
Tokyo#sh appletalk interface brief
Interface        Address      Config        Status/Line Protocol  Atalk Protocol
BRI0             unassigned   not config'd  administratively down n/a
BRI0:1           unassigned   not config'd  administratively down n/a
BRI0:2           unassigned   not config'd  administratively down n/a
Ethernet0        2038.37      Extended      up                    up
Serial0          2022.76      Extended      up                    up
Serial1          unassigned   not config'd  administratively down n/a
Serial2          unassigned   not config'd  administratively down n/a
Serial3          unassigned   not config'd  administratively down n/a
```

Explanation: The two interfaces you configured (E0, and S0) on router 2 (Tokyo) all show that they are 'up'. This means that they are properly configured and operational. This is a good quick check to see if the Appletalk protocol is running. If one of the interfaces that you have configured is 'down', check to be sure that the interface at the other end of the link has the same Appletalk cable range configured on it. The number after the cable-range number is the host number. The host number is dynamically assigned and will probably be different in your display.

1606 — **Use a brief version of a show command to see that the Appletalk protocol is properly configured and running on the London router.**

Action: show appletalk interface brief

Result:

```
London#show appletalk interface brief
Interface        Address      Config        Status/Line Protocol  Atalk Protocol
BRI0             unassigned   not config'd  administratively down n/a
BRI0:1           unassigned   not config'd  administratively down n/a
BRI0:2           unassigned   not config'd  administratively down n/a
Ethernet0        2045.215     Extended      up                    up
Serial0          unassigned   not config'd  administratively down n/a
Serial1          2013.235     Extended      up                    up
Serial2          unassigned   not config'd  administratively down n/a
Serial3          unassigned   not config'd  administratively down n/a
```

Explanation: The two interfaces you configured (E0, and S1) on router 3 (London) all show that they are 'up'. This means that they are properly configured and operational. This is a good quick check to see if the Appletalk protocol is running. If one of the interfaces that you have configured is 'down', check to be sure that the interface at the other end of the link has the same Appletalk cable range configured on it. The number after the cable-range number is the host number. The host number is dynamically assigned and will probably be different in your display.

1606 — **Use a show Appletalk command to view all of the Appletalk parameters of a particular interface.**

Action: show Appletalk interface

Result:

```
NewYork#show appletalk interface serial 0
Serial0 is up, line protocol is up
  AppleTalk cable range is 2010-2019
  AppleTalk address is 2010.174, Valid
  AppleTalk zone is "cereal zone"
  AppleTalk port configuration verified by 2013.235
  AppleTalk address gleaning is not supported by hardware
  AppleTalk route cache is enabled
```

Explanation: The important thing to note here is that the interface shows 'up' and line protocol is 'up'. This means the interface is communicating with the network it is connected to. You can also see the Appletalk address of this interface on the fourth line of the example. You can also see that the configuration of this port has been verified by the router at the other end of the link.

1606 — **Use the 'show Appletalk route' command to look at the Appletalk routing table**

Figure 17-d

Action: show appletalk route

Result:

```
NewYork#show appletalk route
Codes: R - RTMP derived, E - EIGRP derived, C - connected, A - AURP
       S - static  P - proxy
5 routes in internet

The first zone listed for each entry is its default (primary) zone.

C Net 2000-2009 directly connected, Ethernet0, zone cornflakes
C Net 2010-2019 directly connected, Serial0, zone cereal zone
C Net 2020-2029 directly connected, Serial1, zone cereal zone
R Net 2030-2039 [1/G] via 2022.76, 2 sec, Serial1, zone fruit loops
R Net 2040-2049 [1/G] via 2013.235, 0 sec, Serial0, zone cocoa puffs
NewYork#
```

Explanation: After the routing updates propagate (roughly 90 seconds), each router should have five Appletalk routes in its routing table. If they do not, make sure that the routers are properly configured.

Figure 17-e

Figure 18-a

check results

Router 1

```
!
hostname Washington
!
enable password cisco
!
!
interface Ethernet0
 ip address 10.28.0.1 255.255.0.0
 no keepalive
 no shutdown
!
interface Serial0
 ip address 10.33.0.2 255.255.0.0
 ip mroute-cache
 no shutdown
!
interface Serial1
 ip address 10.29.0.1 255.255.0.0
 clockrate 56000
 no shutdown
!
interface Serial2
 no ip address
 shutdown
!
interface Serial3
 no ip address
 shutdown
!
interface BRI0
 no ip address
 shutdown
!
router rip
 network 10.0.0.0
!
no ip classless
!
!
banner motd %

IP RIP Foundation Lab Router1
Version: 1.0
Date: July 10, 1998
Copyright 1998, 1999, MentorLabs, LLC

All rights reserved %

Passwords:
User - cisco
Enable - cisco
!
!
line con 0
 password cisco
 login
line aux 0
line vty 0 4
 password cisco
 login
!
end
```

Router 2

```
!
```

Figure 18-b

```
hostname Minot
!
enable password sanfran
!
!
interface Ethernet0
 ip address 10.30.0.1 255.255.0.0
 no keepalive
 no shutdown
!
interface Serial0
 ip address 10.29.0.2 255.255.0.0
 ip mroute-cache
 no shutdown
!
interface Serial1
 ip address 10.31.0.1 255.255.0.0
 clockrate 56000
 no shutdown
!
interface Serial2
 no ip address
 shutdown
!
interface Serial3
 no ip address
 shutdown
!
interface BRI0
 no ip address
 shutdown
!
router rip
 network 10.0.0.0
!
ip classless
!
!
banner motd %

IP RIP Foundation Lab Router2
Version: 1.0
Date:  July 10, 1998

Copyright 1998, 1999, MentorLabs, LLC
All rights reserved %

Passwords:
User - cisco
Enable - sanfran
!
line con 0
 password cisco
 login
line aux 0
line vty 0 4
 password cisco
 login
!
end
```

Router 3

```
!
hostname Leesville
!
enable password sanfran
!
!
interface Ethernet0
 ip address 10.32.0.1 255.255.0.0
 no keepalive
no shutdown
!
```

Figure 18-c

```
interface Serial0
 ip address 10.31.0.2 255.255.0.0
 ip mroute-cache
 no shutdown
!
interface Serial1
 ip address 10.33.0.1 255.255.0.0
 clockrate 56000
 no shutdown
!
interface Serial2
 no ip address
 shutdown
!
interface Serial3
 no ip address
 shutdown
!
interface BRI0
 no ip address
 shutdown
!
router rip
 network 10.0.0.0
!
ip classless
!
!
banner motd %

IP RIP Foundation Lab Router3
Version: 1.0
Date:  July 10, 1998
Copyright 1998, 1999, MentorLabs, LLC

All rights reserved %

Passwords:
User - cisco
Enable - sanfran
!
line con 0
 password cisco
 login
line aux 0
line vty 0 4
 password cisco
 login
!
end
```

check results

Check your configuration to confirm the network is operating per the Story and Conditions.
{Use appropriate show, debug, and ping commands to verify network operations.}
HINT

Verify that the physical links in the network are running.

Action: show ip interface brief

Result:

```
Hub#sh ip int brief
Interface              IP-Address      OK? Method Status                Protocol
BRI0                   unassigned      YES unset  administratively down down
BRI0:1                 unassigned      YES unset  administratively down down
BRI0:2                 unassigned      YES unset  administratively down down
Ethernet0              192.168.2.129   YES manual up                    up
Serial0                172.18.1.33     YES manual up                    up
Serial1                192.168.2.66    YES manual up                    up
Serial2                unassigned      YES unset  administratively down down
Serial3                unassigned      YES unset  administratively down down

Hub#
```

Explanation: The configured interfaces should all have up for Status and up for Protocol. If not, use other show commands to determine wh

Confirm the routing table on Branch_1 supports the Story and Conditions.

Action: show ip route

Result:

```
Branch_1#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, * - candidate default
       U - per-user static route, o - ODR

Gateway of last resort is 192.168.2.66 to network 172.18.0.0

I*    172.18.0.0/16 [100/82125] via 192.168.2.66, 00:00:11, Serial0
      192.168.2.0/28 is subnetted, 3 subnets
C        192.168.2.64 is directly connected, Serial0
C        192.168.2.192 is directly connected, Ethernet0
I        192.168.2.128 [100/80225] via 192.168.2.66, 00:00:12, Serial0

Branch_1#
```

Explanation: Except for the time since last routing update, your routing table on Branch_1 should match the Results above. Do your metrics well?

Note that the Gateway of last resort and the candidate default route most both appear.

Confirm the routing table on the ISP supports the Story and Conditions.

Figure 19-a

Action: show ip route

Result:

```
ISP#sh ip ro
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, * - candidate default
       U - per-user static route, o - ODR

Gateway of last resort is not set

     172.18.0.0/30 is subnetted, 1 subnets
C       172.18.1.32 is directly connected, Serial1
     10.0.0.0/24 is subnetted, 1 subnets
C       10.1.3.0 is directly connected, Ethernet0
S    192.168.2.0/24 [1/0] via 172.18.1.33
ISP#
```

Explanation: The ISP should have three subnets listed.

Confirm the routing table on the Hub supports the Story and Conditions.

Action: show ip route

Result: *(There are two main possible results, depending on how the default route was confi*

```
Hub#sh ip ro
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, * - candidate default
       U - per-user static route, o - ODR

Gateway of last resort is 172.18.1.34 to network 0.0.0.0

     172.18.0.0/30 is subnetted, 1 subnets
C       172.18.1.32 is directly connected, Serial0
     192.168.2.0/28 is subnetted, 3 subnets
C       192.168.2.64 is directly connected, Serial1
I       192.168.2.192 [100/80225] via 192.168.2.65, 00:00:13, Serial1
C       192.168.2.128 is directly connected, Ethernet0
S*   0.0.0.0/0 [1/0] via 172.18.1.34
Hub#
```

. . . or . . .

```
Hub#sh ip ro
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, * - candidate default
       U - per-user static route, o - ODR

Gateway of last resort is 0.0.0.0 to network 0.0.0.0

     172.18.0.0/30 is subnetted, 1 subnets
C       172.18.1.32 is directly connected, Serial0
     192.168.2.0/28 is subnetted, 3 subnets
C       192.168.2.64 is directly connected, Serial1
I       192.168.2.192 [100/80225] via 192.168.2.65, 00:00:19, Serial1
C       192.168.2.128 is directly connected, Ethernet0
S*   0.0.0.0/0 is directly connected, Serial0
Hub#
```

Explanation: Both options for configuring a default route will support the network.

Note : Do your metrics match as well?

Verify that the network is operating as described in the Story and Conditions.

Figure 19-b

Action: ping *ip-address*

Result:

```
Branch_1#ping 10.1.3.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.3.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 32/34/36 ms

Branch_1#

. . .

ISP#ping
Protocol [ip]:
Target IP address: 192.168.2.129
Repeat count [5]:
Datagram size [100]:
Timeout in seconds [2]:
Extended commands [n]: y
Source address or interface: 10.1.3.1
Type of service [0]:
Set DF bit in IP header? [no]:
Validate reply data? [no]:
Data pattern [0xABCD]:
Loose, Strict, Record, Timestamp, Verbose[none]:
Sweep range of sizes [n]:
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.2.129, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 16/17/20 ms

ISP#ping
Protocol [ip]:
Target IP address: 192.168.2.193
Repeat count [5]:
Datagram size [100]:
Timeout in seconds [2]:
Extended commands [n]: y
Source address or interface: 10.1.3.1
Type of service [0]:
Set DF bit in IP header? [no]:
Validate reply data? [no]:
Data pattern [0xABCD]:
Loose, Strict, Record, Timestamp, Verbose[none]:
Sweep range of sizes [n]:
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.2.193, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 32/33/36 ms

ISP#
```

Explanation: Your ping tests from Branch_1 to the subnet 10.1.3.0 should be successful. Extended ping tests from the ISP's Ethernet to th Ethernet and Branch_1's Ethernet should also be successful.

Verify that the routing updates have been miminized as described in the Story and Conditions.

Action: debug ip packet

Result:

```
ISP#debug ip packet
IP packet debugging is on
ISP#
. . .
ISP#no debug ip packet
IP packet debugging is off
ISP#
```

Explanation: The debugging information should be quiet after several minutes. If so, you can turn off IP packet debugging, and know that IG routing packets are not being sent to the ISP.

Figure 19-C

1002. Connectivity Between Routers
vLab Archive

▼ Archive History

▼ Archive Date

Date Lab Started : 1999-Jul-15 16:06:40.864802

Date Lab Completed : 1999-Jul-15 16:09:49.268665

Date Lab Archived : 1999-Jul-15 16:10:23.670189

▼ Lab Information

2002 — Plan

2004 — Debrief

2006 — Saved Configs

Figure 20

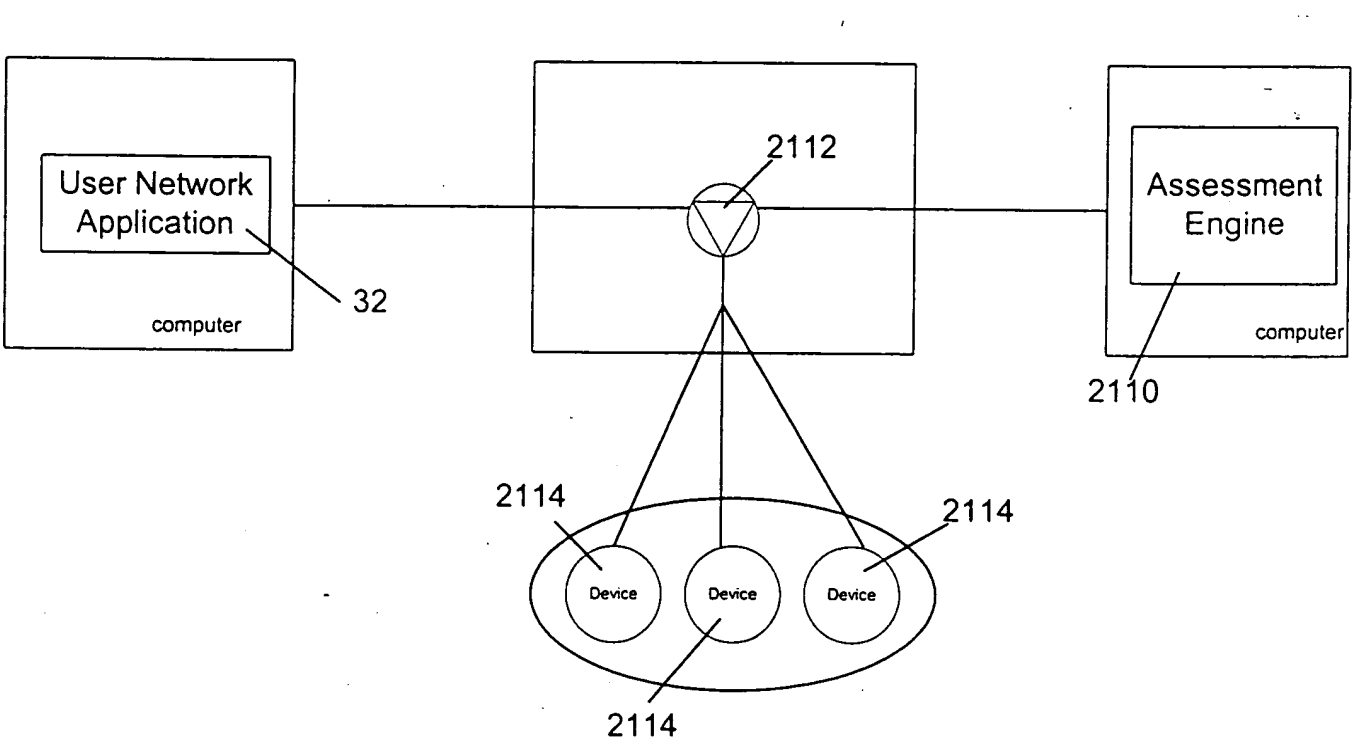

User Network Application
32
computer
2112
Assessment Engine
computer
2110
2114
2114
Device
Device
Device
2114

Figure 21

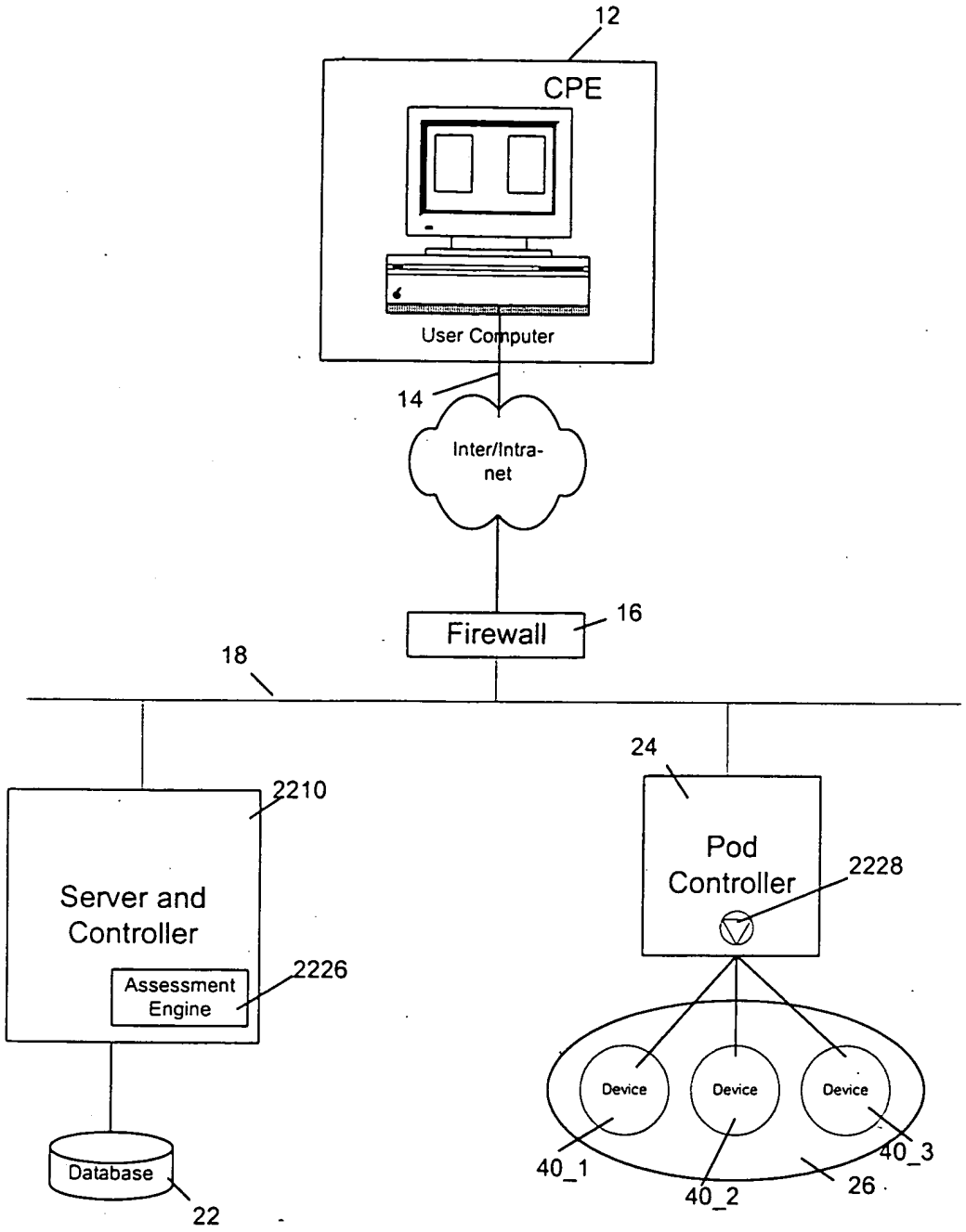

12
CPE
User Computer
14
Inter/Intra-
net
Firewall
16
18
24
2210
Server and
Controller
Assessment
Engine
2226
Pod
Controller
2228
Device
Device
Device
40_1
40_2
40_3
26
Database
22

Figure 22

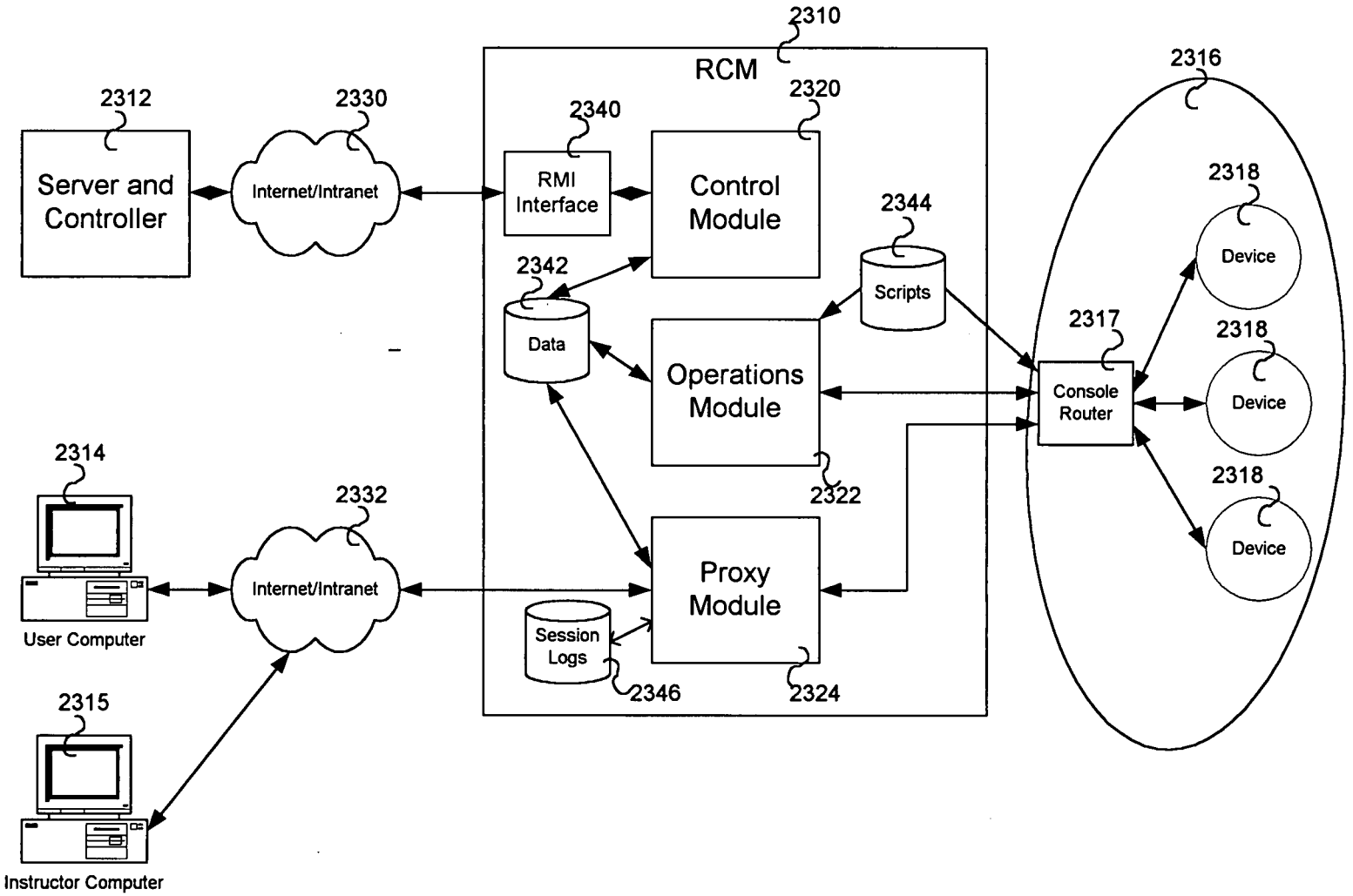
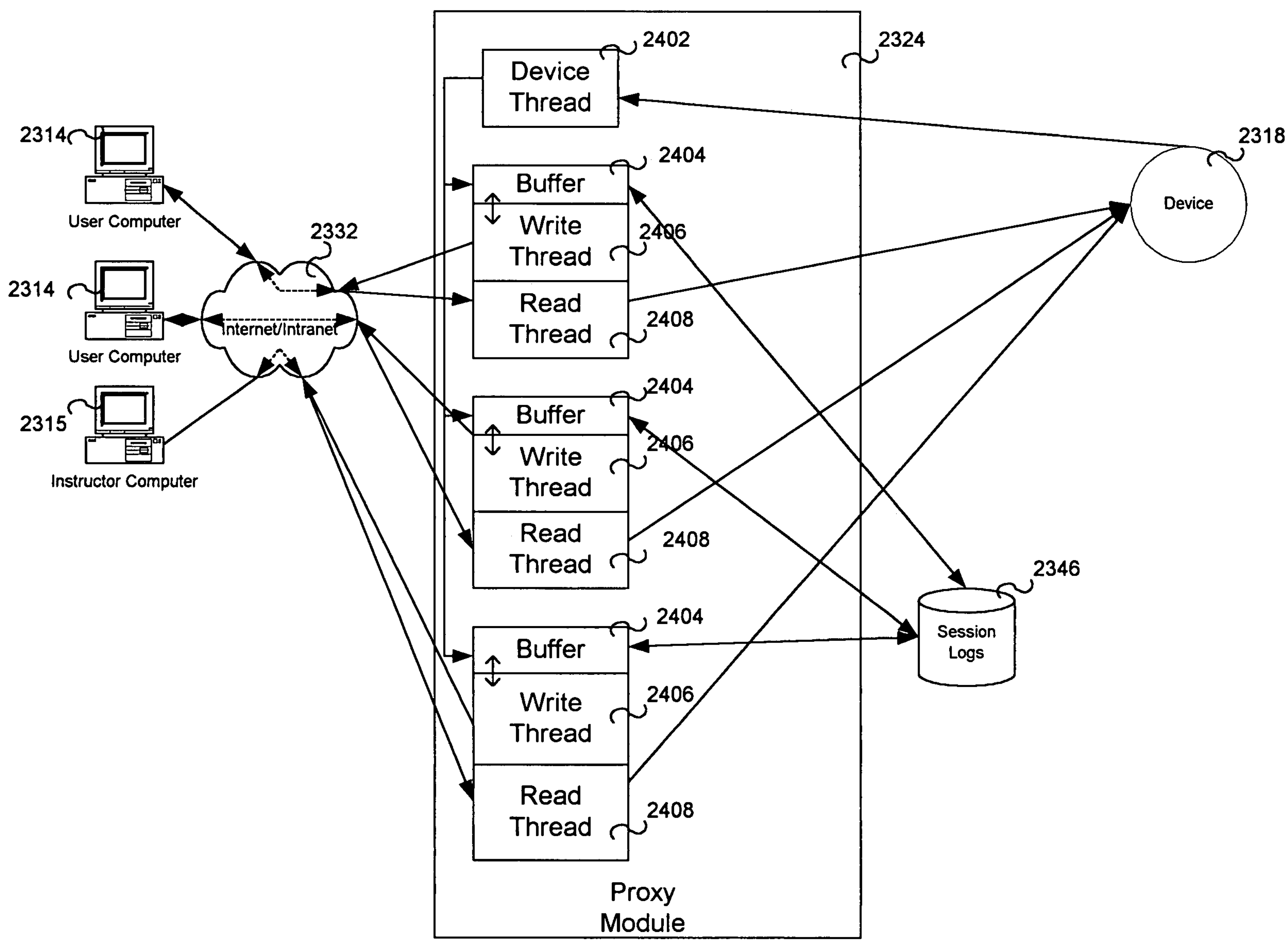

2310
RCM
2312
Server and Controller
2330
Internet/Intranet
2340
RMI Interface
2320
Control Module
2344
Scripts
2342
Data
Operations Module
2322
2316
2318
Device
2317
Console Router
2314
2332
Internet/Intranet
User Computer
Proxy Module
Session Logs
2346
2324
2315
Instructor Computer

Figure 23



2314
User Computer
2314
User Computer
2315
Instructor Computer
2332
Internet/Intranet
2324
2402
Device
Thread
2404
Buffer
2406
Write
Thread
2408
Read
Thread
2404
Buffer
2406
Write
Thread
2408
Read
Thread
2404
Buffer
2406
Write
Thread
2408
Read
Thread
Proxy
Module
2318
Device
2346
Session
Logs

Figure 24